

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

INFECTION PREVENTION TECHNOLOGIES, LLC,

Plaintiff,

vs

Case No: 10-12371

Honorable Victoria A. Roberts

LUMALIER CORPORATION,

Defendant.

ORDER ON CLAIM CONSTRUCTION

I. INTRODUCTION

Plaintiff Infection Prevention Technologies, LLC (“IPT”) brought this suit against Defendant Lumalier Corporation (“Lumalier”) seeking, among other relief, a declaration that its device does not infringe Lumalier’s patents, both titled “Ultraviolet Area Sterilizer And Method Of Area Sterilization Using Ultraviolet Radiation,” U.S. Patent No. 6,656,424 (“’424 patent”) and U.S. Patent No. 6,911,177 (“’177 patent”) (collectively, “the patents”). The ‘177 patent is a continuation-in-part application of the ‘424 patent, and, therefore, includes the same disclosures as the ‘424 patent. Lumalier filed counterclaims against IPT for infringement of the patents.

On July 24, 2012, the Court held a hearing in accordance with *Markman v. Westview Instruments*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff’d* 517 U.S. 370 (1996). The parties submitted extensive written briefs in support of their positions. In this Order, the Court construes ten disputed claim terms identified by the parties.

The Court's construction is set forth in Appendix A.

II. BACKGROUND

A. The Technology of the Patents

The patents are directed to a method and device for sterilizing rooms and similar enclosed areas. (Doc. 53-2, '424 patent, col. 1, ll. 14-15) The invention addresses the problem of nonsocomial, or hospital acquired, infections. (*Id.*, col. 1, ll. 19-20)

Nonsocomial infections are both common and costly: a study of such infections in the cardiac surgery unit of a major hospital revealed an infection rate of 27.3% which more than doubled the mortality rate for afflicted patients. (*Id.*, col. 1, ll. 18-23) Moreover, evidence exists that the particular hospital environment contributes to the spread of these dangerous infections by harboring virulent strains of bacteria, fungi, and viruses. (*Id.*, col. 1, ll. 48-50) Other factors that contribute to these infections include overuse of antibiotics and poor personal hygiene. (*Id.*, col. 1, ll. 45-47)

Attempts to eradicate these contaminants in the past -- including use of topical antiseptics and fumigation with formaldehyde gas -- varied greatly in success. (*Id.*, col. 1, ll. 53-64) These methods also have notable drawbacks: topical antiseptics cannot penetrate electronics without causing damage, while gas is time-consuming, dangerous for workers, and environmentally unwise. (*Id.*)

The "Brief Summary Of The Invention" describes an ultraviolet area stabilizer ("UVAS") that sterilizes a room by emitting ultraviolet light. (*Id.*, col. 2, ll. 15-42) The UVAS can be either mobile or stationary and is placed in a room such as an operating room or intensive care unit where concern exists about the presence of pathogenic

bacteria. (*Id.*, col. 2, ll. 16-21). The device works by emitting ultraviolet-C (“UV-C”) light, a high frequency wavelength of light within the ultraviolet band that is effective at killing bacteria. (*Id.*, col. 2, ll. 3-5, 25-26). In the words of the Summary:

After the bulbs have reached a steady state of output, an array of UV-C sensors scan the room, and determine the darkest area, or the area reflecting the lowest level of UV-C back to the sensors. A BASIC Stamp contained in the device calculates the time required to obtain a bactericidal dose of UV-C reflected back from the darkest area. The UVAS transmits the calculated dose of UV-C, as well as other monitoring information, to the remote control where it is displayed to the operator. Once a bactericidal dose has been reflected to all the sensors, the unit notifies the operator and shuts down. By relying on reflected doses rather than direct exposure, the UVAS is able to sterilize or sanitize all surfaces within the room that are within view of an exposed wall or ceiling. The pathogenic bacteria in the room have been effectively eliminated.

(*Id.*, col. 2, ll. 28-42)

B. Procedural History of the Patents

On September 19, 2000, inventor Jeffrey L. Deal filed the application, U.S. Patent Application Serial No. 09/665,151, which later issued as the ‘424 patent. (Doc. 53-4, IPT’s Claim Const. Br., Ex. C, pp. 15-37) On April 8, 2003, the patent examiner rejected all claims over the prior art. (*Id.*, Ex. C, pp. 46-52) Specifically, claims 1 and 2 of the patent were rejected as unpatentable over Owesen, U.S. Patent No. 5,891,399 A, in view of German patent DE 29812427 and Cimino et al., U.S. Patent No. 6,433,343 B1. (*Id.*, Ex. C, p. 49) Claims 3 and 4 were rejected as being anticipated by Owesen. (*Id.*, Ex. C, p. 48)

In rejecting all claims of the ‘424 patent, the examiner discussed the prior art. Owesen “teaches a method of sterilizing an enclosed area (a room) with UV-C radiation” and “desires to achieve complete irradiation of all exposed surfaces in the room.” (*Id.*, Ex. C, p. 49) German patent DE ‘427 “teaches the sterilization of an

enclosed area wherein a sensor is used to assure that the amount of radiation necessary for achieving sterilization is received by the area surfaces.” (*Id.*) In view of DE ‘427, the examiner continued: “It would have been obvious to one of ordinary skill in the art to employ a sensor in the method of Owesen, as Owesen repeatedly teaches that an object of the invention is to achieve complete irradiation of all room surfaces.” (*Id.*, Ex. C, p. 49) Lastly, the examiner found that “Cimino et al . . . teaches that it is known in the art to use a plurality of sensors . . . located at multiple points within a chamber in order to ascertain when the desired amount of UV radiation has been received in all portions of the chamber. At such a point, a feedback control shuts off the radiation means. (*Id.*)

Prior to filing a written response to the examiner’s rejection, on May 13, 2003 applicant’s attorney Bill Killough conducted a telephonic interview with the primary examiner, Leigh McKane. In the interview, the parties discussed the prior art that was the basis for the examiner’s rejection. The examiner memorialized the substance of the interview as follows:

Mr. Killough explained that the present invention measures reflected radiation, as opposed to emitted radiation, in order to ascertain sterilization effectiveness. The Examiner agreed that neither Cimino et al nor DE 29812427 teach measuring reflected radiation. However, since the sensor of Owesen is located on the housing, it would inherently measure some reflected radiation, whether intended or not. Mr. Killough will file a response addressing these issues.

(*Id.*, Ex. C., Interview Summary, p. 71)

On May 21, 2003, applicant filed a written response to further distinguish the prior art on the grounds that the ‘424 patent requires measuring reflected radiation as opposed to emitted radiation. (*Id.*, Ex. C, Response to Official Action Dated April 8,

2003, pp. 53-70) Describing this “critical” distinction, applicant stated:

Sensors that measure reflected radiation, rather than measuring UV-C radiation that is emitted directly from the emitters, control the operation of the device. Operational control by measuring reflected radiation is novel and unique to the device. This feature is critical to effective disinfection of an area such as a room. (*Id.*, Ex. C., p. 61)

Applicant maintained that each of the rejected claims requires, among other things, that the device receive and measure *reflected* radiation rather than directly emitted radiation. For example, applicant pointed to one of the requirements of claim 1, “measuring a reflection of ultraviolet-C radiation from each of multiple points within (an) enclosed area.” (*Id.*, Ex. C, p. 62) Applicant then argued that “[t]he Official Action does not state how the German patent or *Cimino et al.* measure “a reflection of ultraviolet-C radiation” as required by Claim 1.” (*Id.*) Applicant further stated that this limitation is “material to the present invention.” (*Id.*)

Applicant then distinguished the prior art in that each included sensors which received direct radiation rather than reflected radiation. To distinguish the German patent DE ‘427, applicant wrote:

It is clear from the structure of this device that the sensor is positioned to receive direct radiation from the emitters, since the sensor is placed remotely from the emitters, and in direct line of sight from the upper portion of the emitters. The position of the sensor is such that it would not receive radiation reflected from inside the container which is being sterilized. For the UV sensor of the German patent to receive reflected UV radiation from the area being sterilize (sic), which is the container, the sensor would have to be positioned within the container, and not externally to the container.

(*Id.*, Ex. C, p. 63)

Applicant similarly distinguished Cimino on the grounds that its reflectors could not measure reflected radiation:

As with the German patent, these detectors are positioned near a wall of the housing, while the bulbs are more centrally located. The detectors are in a direct line of sight from the bulbs, so that they receive direct radiation. *Cimino et al.* do not position the detectors for “measuring a reflection of ultraviolet-C radiation” as required by Claim 1.

(*Id.*)

Applicant made a slightly different argument to distinguish Owesen. The examiner had rejected claims 3 and 4 of the patent as being anticipated by Owesen. Anticipation means that all limitations of the claim are present in the prior art. To overcome anticipation, applicant essentially argued that even though the Owesen sensor received some reflected radiation, it also received directly emitted radiation. Therefore, the Owesen sensor could not measure reflected radiation because the sensors could not distinguish between direct versus emitted radiation. Applicant stated in its response:

The Official Action fails to explain how *Owesen* meets the limitation of element (c) of Claim 3 that the radiation receiver “receives reflected ultraviolet-C radiation” and that the “receiver measures said reflected ultraviolet-C radiation.” . . . It is apparent that this UV probe does not receive or measure reflected ultraviolet-C radiation. Even if there is incidental reflected radiation that is received by the probe (which is not indicated by *Owesen*), there is no indication in the reference that the reflected radiation is measured. A mixture of reflected and direct measurement by an individual sensor negates the ability to determine adequate exposure and decontamination in a changing environment.

(*Id.*, Ex. C, pp. 64-65)

On June 25, 2003, the examiner found all claims of the ‘424 patent allowable as amended. (*Id.*, Ex. C, Notice of Allowability, pp. 72-78)

C. The Claims of the Patents

The ‘424 patent has four independent claims: claims 1, 3, 6, and 14. Claims 1 and 6 are representative and are reproduced here by way of example.

Claim 1 provides:

1. A method of *sterilizing* an area using ultraviolet light, comprising the steps of:
 - (a) causing ultraviolet-C radiation to be emitted within an enclosed area;
 - (b) *measuring a reflection of ultraviolet-C radiation* from each of multiple points within said enclosed area;
 - (c) *calculating* the ultraviolet-C radiation level necessary to *sterilize* said enclosed area and comparing it with the measured *reflected ultraviolet-C radiation*;
 - (d) terminating the emission of ultraviolet-C radiation after determining that the required minimum ultraviolet-C radiation has been *reflected* from each of said multiple points within said enclosed area.
- (‘424 patent, col. 5, ll. 50-63 (disputed claim terms emphasized))

Claim 6 provides:

6. A method of disinfecting an area using ultraviolet radiation, comprising the steps of:
 - (a) causing an emission of ultraviolet-C radiation within an enclosed area;
 - (b) providing at least one sensor that receives only reflected ultraviolet-C radiation received from said emission of ultraviolet-C radiation;
 - (c) measuring a level of reflected ultraviolet-C radiation received by said at least one sensor; and
 - (d) terminating the emission of ultraviolet-C radiation upon determining that a cumulative level of reflected ultraviolet-C radiation has been received by at least one sensor.
- (*Id.*, col. 6, ll. 20-33)

The ‘177 patent, which is a continuation-in-part of the ‘424 application, has three independent claims: claims 1, 7, and 11. Claims 1, 7, and 11 of the ‘177 patent are nearly identical to claims 1, 3, and 6 of the ‘424 patent and will not be reproduced here.

III. THE LAW OF CLAIM CONSTRUCTION

An analysis of a patent infringement claim involves two steps. The first step is “determining the meaning and scope of the patent claims asserted to be infringed.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995). The second step is “comparing the properly construed claims to the devices accused of infringing.” *Id.* The Court is called upon to perform the first step, commonly referred to as claim construction.

The claims of a patent “define the invention which the patentee is entitled to exclude others from practicing.” *Am. Calcar, Inc. v. Am. Honda Motor Co., Inc.*, 651 F.3d 1318, 1336 (Fed. Cir. 2011) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc)). Thus, the purpose of claim construction “is to determine the meaning and scope of the patent claims that the plaintiff alleges have been infringed.” *Every Penny Counts, Inc. v. Am. Express Co.*, 563 F.3d 1378, 1381 (Fed. Cir. 2009). Claim construction is a question of law for the court. *Markman*, 52 F.3d at 979; *Cybor Corp. v. FAS Technologies, Inc.*, 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc) (reaffirming that claim construction is purely a question of law for the court).

The starting point for claim construction analysis is the words of the claims themselves. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) (“First, we look to the words of the claims themselves, both asserted and nonasserted, to define the scope of the patented invention.”); *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004) (“[A] claim construction analysis must begin and remain centered on the claim language itself, for that is the language the patentee has chosen to particularly point out and distinctly claim the subject matter which the patentee regards as his invention.”) (internal quotations and

citations omitted).

Claim terms “are generally given their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312 (citing *Vitronics*, 90 F.3d at 1582); *Elbex Video, Ltd. v. Sensormatic Elecs. Corp.*, 508 F.3d 1366, 1371 (Fed. Cir. 2007) (“Claim terms are entitled to a ‘heavy presumption’ that they carry their ordinary and customary meaning to those skilled in the art in light of the claim term's usage in the patent specification.”). “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Phillips*, 415 F.3d at 1313.

In some cases, the ordinary meaning of a claim term as understood by a person of skill in the art may be readily apparent even to lay persons, such as judges. In these cases, claim construction “involves little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314. Under these circumstances, general purpose dictionaries may be helpful. *Id.* In many cases, though, the meaning of a claim term as understood by a person of skill in the art is not readily apparent to those unskilled in the art. When this is the case,

the court looks to those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean. Those sources include the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.

Id. (internal quotations and citations omitted).

As a starting point, the claims themselves provide substantial guidance as to the meaning of particular claim terms. First, the context in which a particular term is used within a claim can be instructive. For example, in *Phillips*, the court was asked to

construe the term “steel baffles.” The Federal Circuit noted that the claim term “steel baffles” strongly implied “that the term ‘baffles’ does not inherently mean objects made of steel.” *Id.* at 1314. Second, differences among claims can be a helpful guide in understanding the meaning of claim terms. *Id.* This is known as claim differentiation. “For example, the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Id.* at 1314-15.

The claims, however, do not stand alone; they must be read in view of the specification. *Id.* at 1315. “The specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Id.* (quoting *Vitronics*, 90 F.3d at 1582). The importance of the specification derives from its statutory role: 35 U.S.C. § 112 requires that the specification describe the claimed invention in “full, clear, concise, and exact terms.” *Id.* Moreover, the patentee may act as its own lexicographer in the specification, giving a special definition to a claim term that differs from the meaning it would otherwise possess. *Id.* at 1316. Or, the specification “may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor.” *Id.*

When consulting the specification, though, the court must be mindful not to read limitations from the specification into the claims. *Comark Communications v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir. 1998). The distinction between reading the claims in light of the specification and reading a limitation from the specification into the claim is often quite delicate. *Id.* The court must be careful to avoid the latter while doing the former. *See Sjolund v. Musland*, 847 F.2d 1572, 1581 (Fed. Cir. 1988)

(“While . . . claims are to be interpreted in light of the specification and with a view to ascertaining the invention, it does not follow that limitations from the specification may be read into the claims.”); *Texas Inst., Inc. v. United States Int’l Trade Comm’n*, 805 F.2d 1558, 1563 (Fed. Cir. 1986) (“This Court has cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification.”).

Another source of intrinsic evidence the Court may consider is the patent’s prosecution history. The prosecution history “consists of the complete record of the proceedings before the PTO and includes the prior art cited during the examination of the patent.” *Phillips*, 415 F.3d at 1317. Like the specification, the prosecution history “can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it otherwise would be.” *Id.* (citing *Vitronics*, 90 F.3d at 1582-83). Claim scope may be limited or disavowed through the doctrine of prosecution disclaimer where “a patentee unequivocally imparted a novel meaning to those [claim] terms or expressly relinquished claim scope during prosecution” *Omega Engineering, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003). However, the Federal Circuit cautioned that “because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes.” *Phillips*, 415 F.3d at 1317.

Lastly, courts are authorized to rely on extrinsic evidence, “which consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Id.* For a variety of reasons, extrinsic

evidence is less reliable than intrinsic evidence. See *Id.* at 1318-19 (“[U]ndue reliance on extrinsic evidence poses the risk that it will be used to change the meaning of claims in derogation of the indisputable public records consisting of the claims, the specification and the prosecution history, thereby undermining the public notice function of patents.”) (internal quotations and citations omitted). Therefore, the court should look *first* to the intrinsic evidence. *Vitronics*, 90 F.3d at 1582. If the court then chooses to consult extrinsic evidence, it must be “considered in the context of the intrinsic evidence.” *Phillips*, 415 F.3d at 1319. Extrinsic evidence should only be used by the court to enhance its understanding of the technology. *EMI Group N. America, Inc. v. Intel Corp.*, 157 F.3d 887, 892 (Fed. Cir. 1998). “[I]t cannot be used to contradict the established meaning of the claim language.” *Gart v. Logitech*, 254 F.3d 1334, 1340 (Fed. Cir. 2001).

IV. ANALYSIS

The parties dispute the meaning of ten terms. The Court considers these in turn.

A. “a reflection of ultraviolet-C radiation” / “reflected ultraviolet-C radiation”

The asserted claims 1, 3, 6, and 14 of the ‘424 patent and claims 1 and 11 of the ‘177 all include the term “a reflection of ultraviolet-C radiation” or the equivalent term “reflected ultraviolet-C radiation.”

IPT maintains that the Court must construe the term as “*radiation that is reflected from items in an area as opposed to radiation that is from the UV-C device directly.*” (IPT’s Claim Constr. Br. at 7) IPT says its construction is not based on a prosecution history disclaimer of the ordinary meaning of reflected radiation, but on the ordinary

meaning as informed by the specification and the prosecution history. (IPT's Resp. to Lumalier's Claim. Constr. Br. at 3, n.1)

Lumalier states that the term should be given its ordinary and customary meaning, which it says is "*any ultraviolet-C radiation that has bounced off any surface.*" (Lumalier's Claim Const. Br. at 7) In support of its position, Lumalier cites *Phillips*, which states: "In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." 415 F.3d at 1314. Lumalier says that nothing in the specification or prosecution history provides any reason for the Court to stray from the plain and ordinary meaning. (*Id.* at 8) Further, Lumalier says that "reflected radiation" and "measure" should be read together to encompass "not only measuring reflected radiation, but also allowing the device or method to measure direct radiation." (Lumalier's Rebuttal Br. at 13)

1. An Analysis of the Claims in Light of the Specification Favors IPT's Construction

The Court must begin its analysis with a review of the claim language itself. *Vitronics*, 90 F.3d at 1582. Each of the asserted claims explicitly provides that the device measures *reflected* radiation, not merely radiation. IPT argues that Lumalier's proposed construction improperly seeks to read "reflected" out of the claims. IPT states:

The asserted claims recite "measuring *reflected* radiation." If the patentee desired claims which cover measurement of any type of radiation, reflected or otherwise, the patentee could have simply used the phrase "measuring radiation." The patentee did not use such language and is bound to the precise

words used in his claims.

(IPT's Claim Const. Br. at 7)

The Court finds IPT's argument persuasive. Any construction that would render superfluous the claim language "reflected" is disfavored. See *Digital-Vending Services Int'l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012) (finding construction that rendered certain claim language surplusage was "contrary to the well-established rule that 'claims are interpreted with an eye toward giving effect to all terms in the claim.'" (quoting *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006))); see also *Phillips*, 415 F.3d at 1314 (use of term "steel baffles" strongly implied that baffles are not inherently made of steel); *Fifth Generation Computer Corp. v. Int'l Bus. Machines Corp.*, 416 Fed. App'x 74, 79 (Fed. Cir. 2011) ("Th[e] [public] notice function would be undermined, however, if courts construed claims so as to render characteristics specifically described in those claims superfluous. As such, we construe claims to give effect to all of their terms." (internal citation omitted)). Thus, the court must construe the disputed language to give full effect to the term "reflected."

The specification provides guidance on the proper construction of reflected radiation. See *Vitronics*, 90 F.3d at 1582 (the specification is "the single best guide to the meaning of a disputed term."); see also *Adams Respiratory Therapeutics, Inc. v. Perrigo Co.*, 616 F.3d 1283, 1290 (Fed. Cir. 2010) ("Claim terms are not construed in a vacuum divorced from the specification."). Here, the specification explicitly states that reflected radiation is *not* meant to encompass directly emitted radiation. The Abstract explains: "By relying on **reflected doses rather than direct exposure**, the UVAS is able to sterilize or sanitize all surfaces within the room that are within view of an

exposed wall or ceiling.” (‘424 patent, Abstract (emphasis added)) This exact language is repeated in the Summary of the Invention. (*Id.*, col. 2, ll. 38-40) The specification also repeatedly describes “reflected radiation” as radiation reflected “back to the device.” IPT identifies six passages in the specification where radiation is described as being “reflected back.” (*Id.*, Abstract; col. 2, ll. 27-42; col. 3, ll. 29-33; col. 4, ll. 25, 33-35; col. 5, ll. 20-25) In addition, the specification explains that the sensors, because of their position on the device, are only capable of measuring reflected radiation as opposed to direct radiation. The relevant portion reads: “[The sensors] are oriented away from the UVAS, thus measuring the dose of UV-C reflected back to the unit.” (*Id.*, col. 4, ll. 24-25)

Thus, the specification explicitly disavows any construction of reflected radiation that would include radiation directly emitted from the device. “Where the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question.” *Thorner v. Sony Comp. Ent. Am. LLC*, 669 F.3d 1362, 1366 (Fed. Cir. 2012) (quoting *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001)).

The specification defines both what “reflected radiation” is, and what it is not. It *is not* radiation that is directly emitted from the device; it *is* radiation that is “reflected back” to the device. Lumalier’s proposed construction does not take into account this limitation. As IPT explains:

Construing “reflected radiation” to mean “any ultraviolet-C radiation that bounces

off any surface” as Lumalier suggests, is inconsistent with the intrinsic evidence. If reflected radiation could come from the UV-C device as Lumalier’s construction allows since the UV-C device is a surface, the “critical” aspect of the invention is eliminated from the invention.

(IPT’s Claim Constr. Br. at 9)

In sum, reading the entire specification together with the claim language favors IPT’s construction.

2. The Prosecution History Favors IPT’s Construction

All of the claims of the ‘424 patent were initially rejected over the prior art. See *supra* Part II.B. In order to distinguish the invention from the prior art of record, applicant argued that the present invention measures only reflected radiation as opposed to emitted radiation. Applicant is now bound by these representations. See *Ballard Medical Prods. v. Allegiance Healthcare Corp.*, 268 F.3d 1352, 1359 (Fed. Cir. 2001) (“An inventor may use the specification and prosecution history to define what his invention is and what it is not—particularly when distinguishing the invention over prior art.”); *Cybor Corp.*, 138 F.3d at 1457 (“[P]ositions taken before the PTO may bar an inconsistent position on claim construction . . .”).

The Federal Circuit has held that “claims may not be construed one way in order to obtain their allowance and in a different way against accused infringers.” *Spectrum Int’l, Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1379 (Fed. Cir. 1998) (quoting *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed. Cir. 1995)). This rule protects the public notice function of the patent prosecution process. The Federal Circuit explained:

That explicit arguments made during prosecution to overcome prior art can lead to narrow claim interpretations makes sense, because the public has a right to

rely on such definitive statements made during prosecution. Indeed, by distinguishing the claimed invention over prior art, an applicant is indicating what the claims do not cover. Accordingly, claims may not be construed one way in order to obtain their allowance and in a different way against accused infringers.

Spectrum, 164 F.3d at 1379-80 (internal quotations and citations omitted).

Applicant sought a narrow interpretation of reflected radiation during prosecution in order to overcome the prior art and achieve allowance. Applicant cannot now disregard its arguments made during prosecution and seek a broader interpretation of reflected radiation in order to argue for infringement. The public notice function of the prosecution process requires this Court to construe reflected radiation consistent with the interpretation applicant argued for during prosecution.

The Court is particularly persuaded by certain representations made by the applicant in his written response to the examiner's disallowance of all claims. Applicant distinguished the German patent DE '427 on the ground that its "sensor is positioned to receive direct radiation from the emitters." (Doc. 53-4, Ex. C, p. 63.) Applicant made a similar argument to distinguish the Cimino patent: "The detectors are in a direct line of sight from the bulbs, so that they receive direct radiation." (*Id.*) Owesen was distinguished on the ground that because it received a mixture of both direct and reflected radiation it could not measure reflected radiation. (*Id.*, Ex. C, pp. 64-65)

Thus, according to the applicant, the prior art lacked the critical limitation of the present invention: measuring reflected radiation. The applicant stated that "[o]perational control by measuring *reflected* radiation is novel and unique to this device" and that "[t]his feature is critical to effective disinfection of an area such as a room." (*Id.*, Ex. C, p. 61) Further, reflected radiation is radiation that is reflected from the "walls and ceiling

of the room” rather than from the device itself. (*Id.*)

IPT’s proposed construction incorporates the “critical” limitation used by the applicant to distinguish his device from the prior art. The Federal Circuit has long noted that “claim language [must be] limited based on a feature that was described as essential to the invention.” See *Sunrace Roots Enter. Co., Ltd. v. SRAM Corp.*, 336 F.3d 1298, 1305 (Fed.Cir.2003). Lumalier, on the other hand, now seeks a broader construction for “reflected radiation” that could include radiation directly emitted from the device. Specifically, Lumalier argues that the claims allow the device to *receive* direct radiation, even if it only *measures* reflected radiation. This argument is inconsistent with the arguments Lumalier made during prosecution to distinguish prior art; the Court is not persuaded. IPT’s narrower construction is supported by the prosecution history, and the Court finds it persuasive.

3. Lumalier’s Other Arguments Are Inapplicable

Lumalier makes two additional arguments in support of its proposed construction: (1) that use of the term “comprising” in the claims means the claims are open-ended and do not preclude measuring other types of radiation in addition to reflected radiation; and (2) that IPT’s proposed construction ignores the doctrine of claim differentiation. The Court addresses these arguments in turn.

Lumalier says that IPT’s proposed construction is inconsistent with the use of the preamble term “comprising” in the patents. The asserted claims all use the term “comprising” before listing a series of steps. Among the steps are measuring reflected radiation. See *supra* Part II.C. Lumalier cites case law for the proposition that comprising is a word of art that is “well understood in patent law to mean including but

not limited to.” *Exergen Corp. v. Wal-Mart Stores, Inc.*, 575 F.3d 1312, 1319 (Fed. Cir. 2009); *Georgia-Pacific Corp. v. U.S. Gypsum Co.*, 195 F.3d 1322, 1327 (Fed. Cir. 2000) (“The transitional term ‘comprising’ . . . is inclusive or open-ended and does not exclude additional, unrecited elements or method steps.”). From this, Lumalier argues that it is improper to exclude detection of *direct* radiation from the scope of the claims, even though detection of direct radiation is not explicitly provided. (“This added limitation is an effort to exclude subject matter, i.e. detection of direct radiation, from the scope of the ‘asserted claims’ in an effort to avoid infringement. However, IPT’s proposed construction is inconsistent with the use of the preamble term ‘comprising’ in the Patents. (Lumalier’s Claim Const. Br. at 9))

The Court is not convinced. While the Court acknowledges that “comprising” is often an open-ended term, the Federal Circuit has held that the term “comprising” may not alter the scope of the claim. *Spectrum*, 164 F.3d at 1372 (citing *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1271 (Fed. Cir. 1986)). “‘Comprising’ is not a weasel word with which to abrogate claim limitations.” *Id.* The Court has already discussed that the claims, when read in light of the specification and prosecution history, support the limitation that “reflected radiation” not include radiation emitted directly from the device. “The claim term ‘comprising’ cannot restore this excluded subject matter.” *Id.*

Next, Lumalier argues that IPT’s proposed construction ignores claim differentiation. Certain independent claims of the ‘424 patent recite “receive reflected ultraviolet-C radiation” and others recite “receive only reflected ultraviolet-C radiation.” Lumalier argues that the use of “only” in certain claims renders those claims narrower in

scope than the others, and evinces an intent by the drafters that certain claims be limited to receiving only reflected radiation, while other claims not be so limited.

Claim differentiation refers to the “presumption that an independent claim should not be construed as requiring a limitation added by a dependent claim.” *Curtiss-Wright Flow Control Corp. v. Velan, Inc.*, 438 F.3d 1374, 1380 (Fed. Cir. 2006). As a tool for construing claims, it works best in the relationship between independent and dependent claims. *Id.* Where, as here, the Court is asked to use claim differentiation as between independent claims, the Federal Circuit has cautioned that “claim differentiation is a guide, not a rigid rule.” *Id.* at 1381. This is because “claim drafters can . . . use different terms to define the exact same subject matter.” *Id.* at 1380. With these principles in mind, the Federal Circuit held that two principles govern claim differentiation when applied to independent claims: “(1) claim differentiation takes on relevance in the context of a claim construction that would render additional, or different, language in another independent claim superfluous; and (2) claim differentiation can not broaden claims beyond their correct scope.” *Id.* at 1381 (internal quotations and citations omitted).

Here, Lumalier seeks to improperly use claim construction to broaden the claims beyond their correct scope. As discussed in depth above, the specification and prosecution history clearly support a construction of “reflected radiation” that excludes radiation directly emitted from the device. Thus, the great weight of the intrinsic evidence does not support Lumalier’s proposed construction. Moreover, because Lumalier seeks to apply claim differentiation to two independent claims rather than to an independent claim and a dependent claim, the tool is merely a guide, not a rigid rule.

The Court does not believe the addition of “only” in certain claims changes any of its analysis.

For these reasons, the Court adopts IPT’s construction: “*radiation that is reflected from items in an area as opposed to radiation that is from the UV-C device directly.*”

B. “measuring” / “measures”

The asserted claims 1, 3, and 6 of the ‘424 patent, and claims 1 and 11 of the ‘177 patent include the term “measuring” or “measures.”

IPT says the Court should construe the term as “*determining the quantity of.*” IPT says that “measure” is easily understood, and that its definition is consistent with the ordinary meaning of the term as understood by a person of skill in the art. It cites a dictionary definition: “to determine the dimensions, quantity, or capacity of.” Webster’s II New College Dictionary.

Lumalier says the Court should construe the term as “*generating data associated with.*” It says this definition is supported by the specification of the ‘424 patent, particularly at column 4, lines 21-26. The passage describes the operation of the ultraviolet-C radiation sensors. It reads:

The bulbs are powered, and when sufficient time has elapsed to allow the bulbs to reach a steady state output (one minute or less), the BASIC Stamp *reads data* from all the individual sensors located on the array. The array senses 360 degrees at a minimum with overlapping of their window of view. They are oriented away from the UVAS, thus measuring the dose of UV-C reflected back to the unit. This *data* is reflected back to the microcontroller where it is integrated to compute cumulative exposure of UV-C reflected back from each sensor in the array.

(‘424 patent, col. 4, ll. 19-28 (emphasis added))

Lumalier says this passage demonstrates that when a sensor “measures” reflected ultraviolet-C radiation, it is “generating data associated with” the received light.

“Measure” does not require quantifying the light; it only requires “that some data, or information, associated with the received radiation be generated by the device.”

The Court begins its analysis with a review of the claims. The specific language used in the claims indicates that “measures” is properly understood as “quantifies.” The claims provide that at some point the device terminates emission of ultraviolet-C radiation upon determining that a bactericidal dose has been emitted. The device “measures” reflected radiation to determine when termination is appropriate, but the claims use different words to describe the conditions for termination. For example, claim 1 of the ‘424 patent states that termination occurs when the “required minimum” of ultraviolet-C radiation has been reflected. Claim 6 of the ‘424 patent says emission is terminated when the “cumulative level” of ultraviolet-C radiation has been received. Claims 1 and 11 of the ‘177 patent say emission is terminated when the “required . . . level” has been reflected back.

These terms – minimum, cumulative, and level – all relate to the *quantity* of something; to say that they represent *data* in the abstract is too broad a construction. The dictionary confirms. Webster’s New College Dictionary II defines minimum as “the least possible *quantity* or degree” (emphasis added). Cumulative is defined as “enlarging or increasing by successive addition.” Surely, for the device to know when a cumulative measurement of radiation has been received, it needs to know when sufficient quantity of radiation has been received. Lastly, level is described as “relative rank or position.” This term, too, relates to quantity or position.

In its briefs and at oral argument, Lumalier argued that dictionary definitions are not helpful because one of ordinary skill in the art at the time of the invention would not understand “measures” as used in the patents to mean “quantifies.” This is because Lumalier says radiation travels in waves composed of photons, and that these waves and/or photons are not capable of being “quantified” in the dictionary sense of the term. Rather, Lumalier says the sensors on the device make a series of determinations regarding the received radiation, but they do not quantify the radiation. When pressed at oral argument to explain the types of determinations the sensors make, counsel for Lumalier was not able to give a more specific answer.

The Court is not persuaded by Lumalier’s arguments. Nowhere do the claims or the specification speak of “generating data,” or of making a series of determinations with respect to photons or wavelengths. Rather, as explained above, the claims use terms that all relate to quantity, i.e. level, cumulative, minimum. And, while the Court recognizes that the ordinary meaning of a term is the meaning *as understood by one skilled in the art*, Lumalier provided no evidence that one skilled in the art would understand measure as used in the patents to mean something other than quantify. As explained below, the specification and prosecution history do not support Lumalier’s construction. Moreover, argument of counsel is not evidence.

Therefore, the Court agrees with IPT that the language of the claims supports an ordinary meaning construction of measures as “determines the quantity of something.” But, as the Federal Circuit held, the Court cannot “look at the ordinary meaning of the term . . . in a vacuum. Rather, [it] must look at the ordinary meaning in the context of the written description and the prosecution history.” *Phillips*, 415 F.3d at 1313. This is

because the claims are part of a “fully integrated instrument.” *Id.* at 1315. The Court now turns to the specification and prosecution history.

Nothing in the specification changes the above analysis. Although a patentee is free to act as its own lexicographer and give a specialized meaning to a term that differs from the meaning it otherwise possesses, *Id.* at 1316, the patentee did not do so here. In fact, as IPT points out, “generating data associated with” is not discussed anywhere in the specification. Nor does the passage cited by Lumalier (‘424 patent, col. 4, ll 19-28), reproduced above, support its construction. Just because the BASIC Stamp reads “data” from the sensors does not mean the sensors had not already quantified the radiation received. Indeed, the specification and claims, read as a whole, require that the reflected data be quantified in order for the device to determine when to terminate emissions.

The prosecution history strongly supports IPT’s proposed construction. During prosecution, the applicant explained that measuring reflected radiation, rather than radiation that is emitted directly, is “novel and unique to the device” and “critical” to the operation of the device. (Doc. 53-4, Ex. C, p. 61.) Also during prosecution, applicant distinguished the prior art of Owesen on the grounds that it received reflected radiation in addition to direct radiation, and therefore, could not *measure* reflected radiation. (*Id.*, Ex. C, pp. 64-65) Applicant stated: “A mixture of reflected and direct radiation by an individual sensor negates the ability to determine adequate exposure and decontamination in a changing environment.” (*Id.*) Thus, as persuasively argued by IPT in its brief and at oral argument, if the sensor of Owesen received both reflected and direct radiation, it would necessarily *generate data* associated with the reflected

radiation, even though it can not measure it. It would not be able to *quantify* the reflected radiation, though, because of the incidental presence of direct radiation and the inability of the device to distinguish between the two.

Lumalier is bound by its arguments made during prosecution to distinguish Owesen. It cannot now argue that “measure” means to “generate data” because if it had done so during prosecution the claims would not have been allowed.

For the reasons above, the Court adopts IPT’s construction: “*determining the quantity of [something].*”

C. “sterilize”

Asserted claims 1 and 3 of the ‘424 patent, and asserted claims 1 and 11 of the ‘177 patent use the phrases “a method for sterilizing an area using ultraviolet radiation” and “a device for sterilizing an area using ultraviolet radiation.”

In what appears to be a drafting error, the specification introduces two descriptions of “sterilize,” one of which is proposed by IPT, the other of which is proposed by Lumalier. The relevant part provides:

The dual programming modes of the unit allow treatment as required. One mode (Sanitize) kills all known pathogens and requires a lower exposure and thus a shorter time. The other mode (**Sterilize**) **kills all species of bacteria** and requires greater cumulative doses and therefore more time.

The Ultraviolet Area Stabilizer self monitors bactericidal levels. Reflected doses of UV-C are measured, and the device remains activated until bactericidal levels are received. This ensures that areas in relative shadow and not in direct line of sight with the unit are sterilized. Also, the unit can be set to sanitize (kill common pathogens) or **sterilize (kill all microbes).**

(‘424 patent, col. 5, ll. 12-25 (emphasis added))

The dispute is over which of these two definitions should be adopted. As Lumalier

points out, the two definitions are not consistent because “all microbes” encompasses more organisms than the phrase “all species of bacteria.” “All microbes” may include non-bacterial microorganisms such as fungi and viruses.

IPT, relying on a dictionary definition, argues that to “sterilize” something is to free it from all microorganisms. IPT said at oral argument that it was proper to refer to extrinsic evidence to define the term where, as here, the intrinsic evidence is ambiguous or conflicting. IPT further argues that one skilled in the art is well aware of its definition of sterilize.

Lumalier says the proper construction of “sterilize” is kill all species of bacteria. Lumalier relies primarily on the specification which refers repeatedly to the device as relating to killing bacteria. Thus, Lumalier concludes, “[b]ased on the consistent usage of the term ‘bactericidal’ in the specifications of the Patents, one of skill in the art would understand the preamble term ‘sterilizing’ in the ‘asserted claims’ to refer to killing bacteria as opposed to killing all microbes.” (Lumalier’s Claim Constr. Br. at 13)

Of the two different descriptions, Lumalier’s construction is more closely supported by the specification. The Court identifies the following relevant passages:

- “to obtain a *bactericidal* dose” (‘424 patent, Abstract)
- UV-C light “has been shown to be the most *bactericidal* type” (‘424 patent, col. 2., ll. 3-5)
- device positioned “where concern exists regarding the presence of *pathogenic bacteria*” (‘424 patent, col. 2, ll. 19-21)
- “*bactericidal dose*” (‘424 patent, col. 2., ll. 32, 36)
- “The *pathogenic bacteria* in the room have been effectively eliminated.”

(‘424 patent, col. 2, ll. 40-42)

- “calculations regarding *bactericidal* doses” (‘424 patent, col. 3, ll. 58-59)
- paragraph description of effectiveness at killing various types of bacteria (‘424 patent, col. 4, ll. 43-67)
- “the device remains activated until *bactericidal* levels are received” (‘424 patent, col. 5., ll. 20-22)

All of these passages from the specification, which consistently discuss the device as a means of killing bacteria rather than all microbes, strongly support Lumalier’s construction.

IPT’s dictionary definition is unpersuasive in light of the overwhelming intrinsic evidence that sterilize as used in the patents refers to killing bacteria. The specification is “the single best guide to the meaning of a disputed term.” *Vitronics*, 90 F.3d at 1582. In *Phillips*, the Federal Circuit cautioned against starting with a dictionary or treatise definition rather than the intrinsic evidence. 415 F.3d at 1321 (“The risk of systematic overbreadth is greatly reduced if the court instead focuses at the outset on how the patentee used the claim term in the claims, specification, and prosecution history, rather than starting with a broad definition and whittling it down.”). Here, the patentee consistently used the claim term to mean killing all species of bacteria; therefore, that description prevails over a conflicting dictionary definition.

IPT also argues the Lumalier’s proposed construction merely adds ambiguity to the term because to kill all *species* of bacteria is not the same as to kill all bacteria in an area. For example, IPT says Lumalier’s construction is open to the interpretation that the device might kill a small amount of each *species* of bacteria in an area, without

killing each and every bacteria. IPT says this construction is designed solely to confuse the jury.

The Court agrees that the portion of Lumalier's proposed construction that speaks of "species" merely adds ambiguity. Although Lumalier's construction is taken directly from the specification, other portions of the specification help to clarify. First, the Summary, after describing the operation of the device, states that "[t]he pathogenic bacteria in the room have been effectively eliminated." ('424 patent, col. 2, ll. 40-42) "Eliminated" refers to bacteria, not each species of bacteria. Another passage describes how direct exposure from the device reduces colony counts of bacteria "by a minimum of 99.9% in one minute and achieve[s] sterilization in 10 minutes." (*Id.*, col. 4, ll. 45-49) Again, this implies that all bacteria are killed, not all *species* of bacteria. Moreover, the claims and specification refer repeatedly to "bactericidal" doses. Webster's II New College Dictionary defines "bactericide" as an agent that destroys bacteria. The implication of the term is that all bacteria are killed, especially when the term is used in conjunction with sterilize. For these reasons, the Court does not include Lumalier's reference to "species" in its construction.

Lastly, for the sake of completeness, the Court notes that there are a couple of other passages in the specification that could support IPT's construction of killing all microbes. First, the "Field the Invention" states that the invention relates to methods and devices for "bacterial, fungal, and/or viral sterilization." ('424 patent, col. 1, ll. 13-14) Second, the "Background of the Invention" discusses how hospitals harbor "virulent strains of bacteria, fungi, and viruses," and that "anti-microbial resistance" is a big problem in hospitals. These passages suggest that the device may have been intended

to address the broader problem of microbes rather than merely bacteria. Yet, where the specification discusses the specific features and operation of the invention, there is no further mention of killing all microbes. Rather, as demonstrated above, the specification speaks only of killing bacteria.

For these reasons, the court adopts Lumalier's construction with modification. "A method for sterilizing an area using ultraviolet radiation" means "*a method for killing all bacteria in an area using ultraviolet radiation.*"

D. "calculating"

Asserted claims 1 and 11 of the '177 patent use the term "calculating an ultraviolet-C radiation reflectance level necessary to sterilize said enclosed area." The phrase is also included in claim 1 of the '424 patent, though IPT argues that claim fails for indefiniteness. See *infra* Part IV.E.

IPT says the Court should construe the phrase as "*determining by a mathematical process the level of reflected UV-C radiation required to kill all microbes in the enclosed area.*" IPT says this definition is consistent with the customary and ordinary meaning of the term. IPT cites a dictionary definition for calculating as "determining by a mathematical process." Webster's II New College Dictionary (2001) IPT also cites to the specification, which discusses how a series of microcontrollers called BASIC stamps perform calculations using algorithms to determine when a bactericidal dose has been emitted. From this, IPT argues that "if the claim language of 'calculating' was changed to 'determining,' there would be no need for the disclosed microcontrollers and algorithms."

Lumalier says the Court should construe the phrase as "*determining an amount*

of ultraviolet-C radiation necessary to kill species of bacteria in the enclosed area.”

Lumalier says that IPT’s proposed construction adds a limitation -- by a mathematical process -- that is not recited in or supported by the intrinsic record. Further, Lumalier says that IPT does not describe what the mathematical process entails, so the phrase actually creates uncertainty.

The proposed constructions include the dispute regarding “sterilize,” discussed in the previous section. The Court’ construction of sterilize, *a method for killing all species of bacteria in an area using ultraviolet radiation*, will be imported into this term. Thus, the only remaining issue is the meaning of “calculating.” The Court turns to that now.

The Court begins its analysis by looking at the claim language itself. As IPT points out, the claims use both terms “calculating” and “determining.” For example, claim 1 of the ‘424 patent reads “**calculating** the ultraviolet-C radiation level . . .” as well as “**determining** that the required minimum ultraviolet-C radiation has been reflected . . .” (‘424 patent, col. 5, ll. 57, 61-62) Yet, Lumalier’s proposed construction defines “calculating” as “determining an amount.” Substituting “determining” for “calculating” is inconsistent with the requirement that the Court give effect to each term in a claim.

Because the two words are used differently in the claims, the Court presumes that they have different meanings. The Federal Circuit explained as follows:

It is certainly established that claims are to be construed to preserve the patent's internal coherence. In addition, in the absence of any evidence to the contrary, we must presume that the use of different terms in the claims connotes different meanings. In other words, the use of two terms in a claim requires that they connote different meanings

Applied Medical Research Corp. v. U.S. Surgical Corp., 448 F.3d 1324, 1333 n.3 (Fed. Cir. 2006) (internal quotations and citations omitted)

Thus, because the drafters of the claims used “calculating” to describe one step and “determining” to describe another, the Court presumes that choice to be deliberate. The two words do not have the same meaning.

The specification offers some guidance on the proper construction of “calculating.” The specification explains that the device is controlled by a series of programmable microcontrollers called BASIC stamps. To determine when the device terminates emission of UV-C radiation, the BASIC stamp “adds the cumulative total of the voltage received” and shuts off the device when it reaches a “minimum cumulative total.” (‘424 patent, col. 3, ll. 36-37, 40) The words “adds” and “cumulative total” imply that a mathematical process must take place. Even more convincing is the fact that the stamps operate using algorithms. The specification states that the stamps can be programmed, “thus allowing alteration to the algorithms to accommodate special circumstances.” (*Id.*, col. 3, ll. 63-65) Use of the word “algorithms” strongly suggests that some mathematical process takes place. Webster’s II New College Dictionary defines algorithm as “a mathematical rule or procedure for solving a problem.”

For these reasons, the Court is persuaded by IPT’s construction of “calculating.” The Court construes the term as “*determining by a mathematical process the level of reflected UV-C radiation required to kill all bacteria in the enclosed area.*”

E. ‘424 Patent Claim 1 Indefiniteness

IPT argues that certain terms within claim 1 of the ‘424 patent render the claim indefinite and, therefore, invalid for failing to satisfy 35 U.S.C. § 112. The terms that IPT says render the claim indefinite are:

- “calculating the ultraviolet-C radiation level necessary to sterilize said enclosed area”
- “the measured reflected ultraviolet-C radiation”
- “the required minimum ultraviolet-C radiation”

IPT asserts that these claim terms lack an antecedent basis. Specifically, IPT argues:

In step (b), the claim recites: “measuring a reflection of ultraviolet-C radiation from each of multiple points within said enclosed area.” Later in the step (c) of the same claim, it states: “calculating the ultraviolet-C radiation level necessary to sterilize said enclosed area and comparing it with the measured reflected ultraviolet-C radiation.” While “the measured reflected ultraviolet-C radiation” must refer to an earlier limitation of the claim, it is unclear what is being referenced. Specifically, it is unclear whether it refers to the reflection that is measured at one point or a aggregate reflection at the several separate “multiple points.”

(IPT’s Claim Const. Br. p. 17 (emphasis in brief))

IPT also says there is no antecedent basis for “the ultraviolet-C radiation level necessary to sterilize said enclosed area” or “the required minimum ultraviolet-C radiation.”

Lumalier says that the claim terms are neither unclear nor lacking in an antecedent basis. Further, the claims enjoy a presumption of validity under Federal Circuit case law.

35 U.S.C. § 112, ¶ 2 requires that a patent specification “conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.” Whether a claim is indefinite under this section is a question of law for courts to make during claim construction. *IGT v. Bally Gaming Int’l, Inc.*, 659 F.3d 1109, 1119 (Fed. Cir. 2011). A claim is definite if “one skilled in the art

would understand the bounds of the claim when read in light of the specification.” *Exxon Research & Eng’g Co. v. United States*, 265 F.3d 1371, 1375 (Fed. Cir. 2001). A claim is only indefinite if it is “not amenable to construction or [is] insolubly ambiguous.” *Ultimax Cement Mfg. Corp. v. CTS Cement Mfg. Corp.*, 587 F.3d 1339, 1352 (Fed. Cir. 2009).

Proof of indefiniteness is a very high standard. “Claims are not indefinite merely because they present a difficult task of claim construction.” *Halliburton Energy Services, Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008). The standard is met only when the “an accused infringer shows by clear and convincing evidence that a skilled artisan could not discern the boundaries of the claim based on the claim language, the specification, and the prosecution history, as well as her knowledge of the relevant art.” *Id.*

One circumstance in which claims have been found to be indefinite is when a term does not have a proper antecedent basis. *Energizer Holdings, Inc. v. Int’l Trade Comm’n*, 435 F.3d 1366, 1370-71 (Fed. Cir. 2006). That said, “the failure to provide explicit antecedent basis for terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable to those skilled in the art, then the claim is not indefinite.” Manual of Patent Examining Procedure, MPEP § 2173.05(e). Here, IPT has not show by clear and convincing evidence that the claim is insolubly ambiguous; the scope of the claim is ascertainable to those skilled in the art.

For the sake of convenience, claim 1 is reproduced here in full:

1. A method of sterilizing an area using ultraviolet light, comprising the steps of:
 - (a) causing ultraviolet-C radiation to be emitted within an enclosed area;

(b) measuring a reflection of ultraviolet-C radiation from each of multiple points within said enclosed area;

(c) calculating the ultraviolet-C radiation level necessary to sterilize said enclosed area and comparing it with the measured reflected ultraviolet-C radiation;

(d) terminating the emission of ultraviolet-C radiation after determining that the required minimum ultraviolet-C radiation has been reflected from each of said multiple points within said enclosed area.

(‘424 patent, col. 5, ll. 50-63)

The Court believes that a clear antecedent basis exists for each of the disputed terms. “Measured reflected ultraviolet radiation” in step (c) refers back to the measured radiation of step (b). The disputed term “required minimum ultraviolet-C radiation” from step (d) refers back to the “calculated” ultraviolet-C radiation from step (c).

The Court rejects IPT’s indefiniteness argument and construes the disputed terms in a manner consistent with its previous constructions, as follows:

- *determining by a mathematical process the level of reflected UV-C radiation required to kill all bacteria in the enclosed area*
- *the quantified radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly*
- *the amount of ultraviolet-C radiation for killing all bacteria in the enclosed area*

F. “around” and “above”

Asserted claim 3 of the ‘424 patent contains the disputed claim term “said plurality of ultraviolet-C radiation emitters are positioned on said base to emit ultraviolet-C radiation 360 degrees around said base and above said base.”

IPT says this claim should be construed as “*the UV-C emitters are positioned on*

the base to emit radiation 360 degrees horizontally around the base and vertically above the base.” IPT seeks to add the term “vertically” because “if the base blocked the bulbs in the vertical direction – the UV-C emitters could not emit radiation above the base.”

Lumalier’s proposed construction reads: “*the at least two ultraviolet-C radiation emitters are positioned on the base to collectively emit ultraviolet-C radiation 360 degrees around the base and to collectively emit ultraviolet-C radiation above the base.*”

Lumalier says its construction is consistent with the plain and ordinary meaning of the terms. Lumalier also says that IPT’s proposed construction seeks to add two terms – “vertically” and “horizontally” – that are not supported by the intrinsic evidence.

The Court agrees with Lumalier. IPT’s proposed addition of vertically and horizontally does not clarify the term; if anything, it adds a limitation that is not present in the intrinsic record. Here, the ordinary meaning of the disputed phrase is obvious, even to a lay person. See *Phillips*, 415 F.3d at 1314 (“In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of widely accepted meaning of commonly understood words.”).

Lumalier’s proposed construction reflects the ordinary meaning; the Court adopts it.

G. “measuring a level of reflected ultraviolet-C radiation received by said at least one sensor”

Asserted claim 6 of the ‘424 patent provides contains the disputed phrase “measuring a level of reflected ultraviolet-C radiation received by said at least one sensor.”

IPT says that these claim limitations have already been addressed *supra* in Sections IV. A-B. Importing its proposed constructions from those claim terms, IPT arrives at the its proposed construction here: “*determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly that is received by at least one sensor.*”

Lumalier’s proposed construction similarly relies on its previous constructions for “reflected ultraviolet-C radiation” and “measuring.” Lumalier proposes: “*generating data associated with ultraviolet-C radiation that has bounced off any surface and has been incident upon the at least one sensor.*”

The Court previously adopted IPT’s constructions for “reflected ultraviolet-C radiation” and measuring. See *supra* Parts IV. A, B. IPT’s construction here merely incorporates its previous proposed constructions. As such, the Court adopts IPT’s construction: “*determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly that is received by at least one sensor.*”

H. “measuring a reflection of ultraviolet-C radiation from the multiple positions within said enclosed area”

Asserted claim 1 of the ‘177 patent contains the phrase “measuring a reflection of ultraviolet-C radiation from the multiple positions within said enclosed area.” The Court has already construed “measuring” and “a reflection of ultraviolet-C radiation”; those constructions will be imported here. The Court is left to construe the term “from the multiple positions within said enclosed area.”

IPT says that “from the multiple positions within said enclosed area” should be

construed as “*from the same positions where ultraviolet-C radiation was emitted.*”

Lumalier says the term should be construed “*from the at least two locations within said the enclosed area.*”

The Court begins its analysis with the language of the claim itself. A couple of issues are evident. The first issue is to what does “from the multiple positions within said enclosed area” refer back to, or modify? Lumalier says it modifies the location of “measuring,” and not the source of the “reflection of ultraviolet-C radiation.” IPT takes the opposite position.

IPT has the stronger argument. Step (a) of claim 1 states: “causing ultraviolet-C radiation to be emitted from multiple positions within an enclosed area.” Step (b), the language in dispute here, states: “measuring a reflection of ultraviolet-C radiation from **the** multiple positions within said enclosed area” (emphasis added). Use of term “the” is informative: it indicates that “multiple positions” in step (b) refers back to “multiple positions” in step (a). IPT’s construction reflects the proper antecedent basis for the disputed phrase.

A second issue that arises from the claim text is whether the measurement that occurs “from the multiple positions” is an aggregate measurement, or an individual measurement from each position. A comparison with the text of claim 11 of the ‘177 patent is instructive. The relevant part of that claim reads: “measuring a *cumulative* reflection of ultraviolet-C radiation from *each* of the multiple positions within said enclosed area” (emphasis added). The text is identical to claim one, with the added limitations “cumulative” and “each.” Comparing the language of the two claims resolves the ambiguity over whether the measurement is aggregate or individualize: use of the

terms “each” and “cumulative” in claim 11 demonstrates that the measurement is from each individual sensor; lack of those terms in claim 1 indicates that the measurement is an aggregate of the multiple sensors.

For these reasons, the Court construes “measuring a reflection of ultraviolet-C radiation from the multiple positions within said enclosed area” as “*determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly from the same positions where ultraviolet-C radiation was emitted.*”

I. “measuring a cumulative reflection of ultraviolet-C radiation from each of the multiple positions within said enclosed area”

Asserted claim 11 of the ‘177 patent contains the disputed phrase “measuring a cumulative reflection of ultraviolet-C radiation from each of the multiple positions within said enclosed area.”

The Court discussed this phrase in the previous section in conjunction with claim 1 of the ‘177 patent. For the reasons stated in that section, the Court construes the phrase as follows: “*determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly from each of the same positions where ultraviolet-C radiation was emitted.*”

J. ‘177 Patent Claims 1 and 11 Indefiniteness

IPT says claims 1 and 11 of the ‘177 are void for indefiniteness because certain claim terms lack an antecedent basis. Step (d) of claim 1 states: “terminating the emission of ultraviolet-C radiation after determining that the required ultraviolet-C radiation reflectance level has been reflected from the multiple positions within said

enclosed area.” Step (d) of claim 11 is identical, with the addition of “each,” so that the relevant part reads “from each of the multiple positions.” IPT says that “the required ultraviolet-C radiation reflectance level” lacks an antecedent basis.

Lumalier says that the disputed termination step, quoted in the previous paragraph, relates back to the “comparing” step (c) of the claim. Specifically, Lumalier says the claim requires the “comparing” step to continue until the “required ultraviolet-C radiation reflectance level has been reflected.” Then, the terminating step (d) causes the emission of ultraviolet-C radiation to end.

The Court cannot say that claims 1 and 11 of the ‘177 patent are insolubly ambiguous. IPT’s indefiniteness argument is rejected.

The Court construes claim 1 as: “*terminating the emission of ultraviolet-C radiation after determining that the required ultraviolet-C radiation has been reflected from the same positions where ultraviolet-C radiation was emitted.*”

The Court construes claim 11 as: “*terminating the emission of ultraviolet-C radiation after determining that the required ultraviolet-C radiation has been reflected from each of the same positions where ultraviolet-C radiation was emitted.*”

V. CONCLUSION

These are the constructions of the Court.

IT IS ORDERED.

S/Victoria A. Roberts
Victoria A. Roberts
United States District Judge

Dated: August 8, 2012

The undersigned certifies that a copy of this document was served on the attorneys of record by electronic means or U.S. Mail on August 8, 2012.

S/Linda Vertriest
Deputy Clerk

Case Name: Infection Prevention Technologies, LLC v Lumalier Corporation

Case Number: 10-12371

APPENDIX A: Claim Construction Chart

Claim Term	IPT's Proposed Construction	Lumalier's Proposed Construction	Court's Construction
"a reflection of ultraviolet-C radiation" "reflected ultraviolet-C radiation"	"radiation that is reflected from items in an area as opposed to radiation that is from the UV-C device directly"	"any ultraviolet-C radiation that bounces off any surface"	"radiation that is reflected from items in an area as opposed to radiation that is from the UV-C device directly"
"measuring" "measures"	"determining the quantity of [something]"	"generating data associated with"	"determining the quantity of [something]"
"a method for sterilizing an area using ultraviolet radiation" "a device for sterilizing an area using ultraviolet radiation"	"a method/device for killing all microbes in an area using ultraviolet radiation"	"a method for killing all species of bacteria in an area using ultraviolet radiation"	"a method for killing all bacteria in an area using ultraviolet radiation"
"calculating an ultraviolet-C reflectance level necessary to sterilize said enclosed area"	"determining by a mathematical process the level of reflected UV-C radiation required to kill all microbes in the enclosed area"	"determining an amount of ultraviolet-C radiation necessary to kill all species of bacteria in the enclosed area"	"determining by a mathematical process the level of reflected UV-C radiation required to kill all bacteria in the enclosed area"

Case Name: Infection Prevention Technologies, LLC v Lumalier Corporation

Case Number: 10-12371

Claim Term	IPT's Proposed Construction	Lumalier's Proposed Construction	Court's Construction
<p>"calculating the ultraviolet-C radiation level necessary to sterilize said enclosed area"</p> <p>"the measured reflected ultraviolet-C radiation"</p> <p>"the required minimum ultraviolet-C radiation"</p>	Indefinite	<p>"determining a bactericidal dose of ultraviolet-C radiation for the enclosed area"</p> <p>"data associated with ultraviolet-C radiation that has bounced off at least one surface within the enclosed area"</p> <p>"the amount of ultraviolet-C radiation for sterilizing the enclosed area"</p>	<p>"determining by a mathematical process the level of reflected UV-C radiation required to kill all bacteria in the enclosed area"</p> <p>"the quantified radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly"</p> <p>"the amount of ultraviolet-C radiation for killing all bacteria in the enclosed area"</p>
"said plurality of ultraviolet-C radiation emitters are positioned on said base to emit ultraviolet-C radiation 360 degrees around said base and above said base"	"the UV-C emitters are positioned on the base to emit radiation 360 degrees horizontally around the base and vertically above the base"	"the at least two ultraviolet-C radiation emitters are positioned on the base to collectively emit ultraviolet-C radiation 360 degrees around the base and to collectively emit ultraviolet-C radiation above the base"	"the at least two ultraviolet-C radiation emitters are positioned on the base to collectively emit ultraviolet-C radiation 360 degrees around the base and to collectively emit ultraviolet-C radiation above the base"
"measuring a level of reflected ultraviolet-C radiation received by said at least one sensor"	"determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly that is received by the at least one sensor"	"generating data associated with ultraviolet-C radiation that has bounced off any surface and has been incident upon the at least one sensor"	"determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly that is received by the at least one sensor"

Case Name: Infection Prevention Technologies, LLC v Lumalier Corporation

Case Number: 10-12371

Claim Term	IPT's Proposed Construction	Lumalier's Proposed Construction	Court's Construction
"measuring a reflection of ultraviolet-C radiation from the multiple positions within said enclosed area"	"measuring a reflection of ultraviolet-C radiation from the same positions where ultraviolet-C radiation was emitted"	"generating, from the at least two locations within the enclosed area, data associated with any ultraviolet radiation that has bounced off any surface"	"determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly from the same positions where ultraviolet-C radiation was emitted"
"measuring a cumulative reflection of ultraviolet-C radiation from each of the multiple positions within said enclosed area"	"measuring a cumulative reflection of ultraviolet-C radiation from the same positions where ultraviolet-C radiation was emitted"	"generating, from each of the at least two locations within the enclosed area, data associated with ultraviolet-C radiation that has bounced off any surface over time"	"determining the quantity of radiation that is reflected from items in a room as opposed to radiation that is from a UV-C emitter directly from each of the same positions where ultraviolet-C radiation was emitted"
"terminating the emission of ultraviolet-C radiation after determining that the required ultraviolet-C radiation reflectance level has been reflected from the multiple positions within said enclosed area"	Indefinite	"terminating, from the at least two locations in the enclosed area, the emission of ultraviolet-C radiation after determining that the required amount of ultraviolet-C radiation has been reflected:	claim 1: "terminating the emission of ultraviolet-C radiation after determining that the required ultraviolet-C radiation has been reflected from the same positions where ultraviolet-C radiation was emitted." claim 11: "terminating the emission of ultraviolet-C radiation after determining that the required ultraviolet-C radiation has been reflected from each of the same positions where ultraviolet-C radiation was emitted."